

电器产品能效状况

Energy efficiency information

For household appliances

GTIHEA

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2005 - 8 - 11

中国能效标准的发展

Development stages of energy efficiency standards

起步阶段 1989-1995

1989年发布第一批共9项家用电器能效标准，1990年12月强制实施

发展阶段 1995-2000

产品范围由家用电器逐步扩展到照明电器、商用以及工业耗能设备

提高阶段 2000_

针对部分用能产品组织有关超前能效指标和能效分等分级指标的研究工作

First stage: 1989-2005

Standards covered 9 household appliances and **was put into force in Dec.1990 as compulsory requirements**

Second stage: 1995-2000

Products covered by standards stretched to lumps, commercial & industry equipment

Third stage from 2000

Research on the Ahead Energy Consumption Standard (include E-E index and classification)

已发布的能效标准

Current energy efficiency national standard

Standard Code	products	Effective year		
GB12021.2-2003	Refrigerator	2003		
GB12021.3-2004	Room air conditioner	2004		
GB12021.4-2004	Cloth washing machine	2004		
GB12021.5-1989	Electric iron	1989		
GB12021.6-2005	Electric rice cookers	1989		
GB12021.7-1989	Color TV	2005		
GB12021.8-1989	Radio	1989		
GB12021.9-1989	Electric fans	1989		
GB17896-1999	Ballasts for tubular fluorescent lamps	1999		
GB18613-2002	Small and medium three- phase asynchronous motor, r	2002		

已发布的能效标准

Current e-e national standard (continued)

Standard Code	products	Effective year		
GB19153-2003	Displacement air compressor	2003		
GB19415-2003	Single-capped fluorescent lamps	2003		
GB19043-2003	Double-capped fluorescent lamps For general lighting service	2003		
GB19044-2003	Self-ballasted fluorescent lamp for general lighting service	2003		
GB19576-2004	Unitary air condition	2004		
GB19577-2004	Chiller Center air condition (heat -pump)	2004		
GB19573-2004	High-pressure sodium lamp	2004		
GB19574-2004	Magnetic ballast for high-pressure sodium lamp; Industry fans	2004		
GB19578-2004	Passenger car	2004		

即将发布的能效标准

Energy-efficiency standards to be issued in near future

- 通风机能效标准
- 清水离心泵能效标准
- 彩色电视机能效标准
- 电力变压器能效标准
- 金属卤化物灯能效标准
- 金属卤化物灯镇流器能效标准
- Fans
- Centrifugal pumps for fresh water
- Color TVs(revised)
- Transformers
- Metal halid lumps
- Ballasts for metal halid lump

正在研制中的能效标准

Energy efficiency standards under development

- ❑ 燃气热水器能效标准
- ❑ 电源适配器能效标准
- ❑ 电动机超前能效标准
- ❑ 变频空调能效标准
- ❑ Gas fired heater;
- ❑ Adapters;
- ❑ Ahead energy consumption standard for motors;
- ❑ Frequency variable air-conditioners.

能效标准与产品标准的关系

Relationship between energy efficiency standard and product standards

- 电器产品标准通常包括：使用性能、安全性能(机械、物理、触电、火灾、毒性、辐射等)、EMC----
- Normally standards for electrical appliances cover performance, safety and EMC etc.
- 能效标准通常是只规定了能效限定值、能效分级结果、结果判断原则等。没有相应的检测方法，通过引用产品标准的检测方法。
- 能效标准通常是强制性。产品使用性能标准通常是推荐性，但通过引用变为强制性。
- In most cases, e-e standard only covers energy efficiency limits, e-e classification, and result assessment. Its test employs product testing method.
- 能效标准制定受产品使用性能标准的制约
- The e-e standard is influenced by product performance standard.
 - 如变频空调能效标准的制定滞后主要原因是变频空调产品使用性能标准没有相应的检测方法
 - The constitution of e-e standard for frequency variable air-conditioners was lagged behind, because there is no corresponding standard for this product.

产品使用性能标准的介绍

An overview to the product performance standard

- 由中国标管委领导的各个TC归口组织行业专家制定。
- Established by industrial experts under the leadership of the Standardization administration of China
- 制定性能标准通常以有利于国内外贸易、通用、统一、协调，有利于与各国相应机构进行数据交换等
- The product performance standard was made for international trading, product unification and harmonization; it made data exchange between national bodies more easier.
- 中国产品使用性能标准通常等效采用ISO标准，使检测结果与欧盟国家标准互认有了很大基础
- China's product performance standard is equivalent to ISO standard, which has set up the base for mutual acceptance with EU counties.
- 中国与欧盟国家产品贸易因技术法规、产品标准相近而变得畅顺 (ISO、IEC、CISPR--)
- China and EU counties share similar technical regulations and product standards (ISO、IEC、CISPR etc.), which results in a freer channel for product trading.

家用电器能耗测试状况

Energy Efficiency Test for Household Electrical Appliances (HEA)

(主要家用电器产品)

(Major HEA)

家用电器(白色)按消费者习惯分类

HEA (white) category classified on usage

- 通风器具：如电风扇、吸油烟机等
- Ventilation: Fans, range hoods etc.
- 取暖器具：如室内加热器等
- Heating: Room heaters etc.
- 制冷器具：如电冰箱、空调器、压缩机等
- Refrigeration: refrigerators, air-conditioners and compressors etc.
- 厨房器具：如电饭锅、电灶、微波炉等
- Kitchen: Rice cooker, electrical roaster and microwave oven etc.
- 清洁器具：如吸尘器、地板洗涤器等
- Cleaning: Vacuum cleaner, floor cleaner etc.

家用电器(白色)按消费者习惯分类

HEA (white) category classified on usage

- 美容器具：如电吹风、卷发器、电动剃须刀等
- Hairdressing: hair dryer, electric crimping iron, electric shaver
- 保健器具：如按摩器、电动牙刷等
- Health care: electric massager, electric toothbrush
- 其它器具：如电烙铁等
- Others: electric iron

国家标准(产品使用性能)涉及的主要家电产品

National Standards (on performance) involved HEA
Major HEA

- 电冰箱(GB8059) Refrigerator (GB8059)
- 空调器(GB7725) Air-conditioner (GB4288)
- 洗衣机(GB4288) Washing machine (GB4288)
- 电熨斗(GB10154) Electric iron (GB10154)
- 自动电饭锅(GB8968) Rice cooker (GB8968)
- 电风扇(GB13380) Electric fan (GB13380)

电冰箱能耗测试情况

E-e Test for Refrigerator

- 涉及的有关标准 Relevant standards
 - 有关安全标准 safety standards
 - IEC60335-2-24 GB4706.13
 - 有关性能(能耗)标准
 - performance (energy efficiency) standards
 - ISO8561 , 7371 , 8187 , 5155
 - GB/T8059.1 ~ 4 GB12021.2
- 在能耗方面及涉及指标的表达式
- The measurement of energy efficiency and involved index
 - 日(年)耗电量 , 电耗限定值,节能评价价值
 - Power consumption (by day/year); Power consumption limits; energy saving assessment value.

中国电冰箱强制性能效标准

MEPS of refrigerators

GB12021.2 -2003:The maximum allowable values of the energy efficiency and energy efficiency grades for household refrigerators

$$E_{\max} = (M \times V_{adj} + N) / 365$$

E_{\max} means the maximum allowable value of energy efficiency in 24 hours

Types	M	N
无星级室的冷藏箱Refrigerator without freezer	0.221	233
带1星级室的冷藏箱Refrigerator with one-star freezer	0.611	181
带2星级室的冷藏箱Refrigerator with two-star freezer	0.428	233
带3星级室的冷藏箱Refrigerator with three-star freezer	0.624	223
冷藏冷冻箱 Refrigerator-freezer	0.697	272
冷冻食品储藏箱Frozen food storage cabinet	0.530	190
食品冷冻箱 food freezer	0.567	205

中国电冰箱能效标准

MEPS of refrigerators (continued)

$$V_{adj} = \sum_{c=1}^n V_c \times F_c \times W_c$$

V_{adj} : 调整容积 adjusted volume

V_c : 有效容积 storage volume

F_c : 常数，无霜室为1.4, 其他为1.0.

F_c : Constant, 1.4 for frost-free compartments and 1 for others

W_c 权重， weight index

Compartment type	Fresh food storage Comp.	Cellar comp.	Chill comp.	One-star freezer comp.	Two-star Freezer comp.	Three-star Freezer comp.	Freezer comp.
W_c	1.00	0.75	1.25	1.55	1.85	2.15	2.15

Or :

$$W_c = \frac{25 - T_c}{20}$$

T_c : rated temperature in “c” compartment

电冰箱能耗测试情况(续)

- 目前节能途经

- 制冷系统

- 高效压缩机，高效蒸发器、冷凝器等
 - 双回路循环系统
 - 控制循环系统的运行状态---(流量控制阀、变频等)

- 绝热系统

- 提高绝热水平，增加发泡层厚度，真空绝热技术
 - 门封系统
 - 减少间室温差的相互影响
 - 减少化霜系统的影响---

电冰箱能耗测试情况(续)

E-e Test for Refrigerator (continues)

- 目前节能途经 Current approach for energy saving
 - 制冷系统 Refrigeration system
 - **highly effective compressor, evaporator and condenser**
 - double loop system
 - Controlling working status of the cycle system-(flow valve, frequency conversion etc.)
 - 绝热系统 Thermal insulation system
 - Improving Thermal insulation level, thickening the foaming layer, employing vacuum thermal insulation technique.
 - gate valve system
 - Reducing the impact of compartment temperature difference
 - Reducing the impact from defrosting system

电冰箱能耗 (续)

— 目前产品能耗特点

- 所开发的节能产品直冷为主
- 不同企业不同产品、同一企业不同产品能耗值相差较大
- 企业开发的节能产品以220升至270升等大容积为主
- 市场的价格影响企业生产节能产品的产量，特别是小容积产品的能耗值偏大
- 间冷式（无霜）产品使用性能优越，但其节能指标未能同步，特大容积的产品能耗值较低，但目前在中国销售量较低

电冰箱能耗 (续)

Refrigeration energy efficiency (continues)

- energy efficiency characteristic of current products
 - Mainly focus on direct cooled products
 - Different products produced by different manufacturers, or different products produced by the same manufacturer are different in their power consumption value.
 - Energy saving product being developed mainly focus on 220L and 270L
 - Market price impacts the yield of energy saving products, especially because the energy efficiency of product with smaller cubage is on the higher side
 - Internal forced air circulation (no frost) refrigerators have a higher performance, but the energy index failed to keep in phase. energy efficiency value for products with extreme large cubage is lower, but its sale volume is also lower.

电冰箱能耗

- 电冰箱能耗

- 试验方法

- 国内外基本协调一致 (GB与ISO)
 - 与北美标准能耗值可比202020性较差 (工况温度、特性温度)
 - 试验方法成熟，试验值能比较准确反应实际运行的能耗。
 - 不同试验室试验所得数据一致性较好 (正确地布置测量点。特性点准确)
 - 试验工程师较易控制人为误差 (如工况温湿度)
 - 测试结果容易实现与国内外不同机构的互认

电冰箱能耗

Refrigeration energy efficiency

- 电冰箱能耗 Refrigeration energy efficiency
 - 试验方法 Testing method
 - GB is basically equivalent to ISO
 - Low comparability with North America on Standard energy efficiency value (differs in working temperature and character temperature)
- Mature testing method. The testing value accurately reflect the actual power consumption.
 - High consistency of Testing data from different laboratories (with correct testing point and accurate characteristic point)
 - Man-made error (such as working tempereture) can be controlled easily
 - Testing data acceptable to foreign testing bodies

空调器能耗情况

- 涉及的有关标准
 - 有关安全标准
 - IEC60335-2-40 GB4706.32
 - 有关性能(能耗)标准
 - ISO5151
 - GB/T7725 GB12021
- 在能耗方面及涉及指标的表达式
 - 能效比 (EER) 性能系数 (COP)

空调器能耗情况

Energy efficiency for Air-conditioner

- Relevant standards
 - safety standards
 - IEC60335-2-40 GB4706.32
 - performance (energy efficiency) standards
 - ISO5151
 - GB/T7725 GB12021
- The measurement of energy efficiency and involved index
 - EER and COP

中国空调能效标准

MEPS of air conditioners

GB12021.3 -2004 :The minimum allowable values of the energy
and energy efficiency grades for room air conditioners

房间空调器能源效率限定值

The minimum allowable value of energy efficiency for
room air conditioners

类型 types	额定制冷量(CC/W) Rated cooling capacity	能效比 EER
整体式window		2.30
分体式 Split	$CC \leq 4500$	2.60
	$4500 < CC \leq 7100$	2.50
	$7100 < CC \leq 14000$	2.40

空调器能耗

- 空调器能耗

- 试验方法

- 国内外基本协调一致 (GB与ISO)
 - 能效比 (EER)、性能系数 (COP) 的测试存在两种典型方法：房间热平衡法、焓差法
 - 试验对人员要求较高，特别对分体式空调及使用焓差法测量
 - 环境要求 (温度、湿度等) 的设定对测量结果影响较大
 - 现有的国内外标准能耗测试方法未能放映变频式空调器的实际水平
 - 引入季节能耗比

空调器能耗

Energy efficiency of Air-conditioner

- Energy efficiency of Air-conditioner
Testing method
 - GB is basically equivalent to ISO
 - Two typical testing method for EER and COP: Moisture Balance Method and Air Enthalpy Difference Method
 - High requirement for testing engineer, especially for those who engaged in Air Enthalpy Difference Method for split air-conditioner.
 - The setting of the ambient (temperature and humidity) has great impact on testing output
 - Current e-e testing method (both home and abroad) does not reflect the actual power consumption level of the frequency variable air-conditioners
 - introduction of seasonal EER

空调器能耗

— 影响空调器实际耗能的因素

- 需调节环境的适用性（房间大小匹配等）
- 空调安装水平（空气的排放、室内外机的安放、房间朝向等）
- 需调节房间的环境质量（密封效果等）
- 使用者的使用习惯（温湿度的设定、风量大小）
 - 空调器的最佳工作系数
- 室外机的环境污染，造成空调器的能耗值逐渐增大（这往往使用者意识不到）
- 变频空调器实际运行能耗与测试差异较大

- 结论：实际的能耗值与试验值有较大差异

空调器能耗

Energy efficiency of Air-conditioner

- Factors to influence the actual power consumption of air-conditioners
 - Applicability of the room (matchable room dimension etc.)
 - The installation of the air-conditioner (ventilation, allocation of the outdoor and indoor units, room position etc.)
 - Environmental quality of the room (hermetic capability etc.)
 - User's habit (the setting of the temperature and airflow)
 - the best working parameter of the air-conditioner
 - Pollution on the outdoor unit lead to the increase of energy consumption of air-conditioners (most users are not conscious about this)
 - The actual power consumption value and testing output have great difference.
- Conclusion: There is big margin between the actual power consumption value and the testing output.

微波炉能耗

- 涉及的有关标准
 - 有关安全标准
 - IEC335-2-25 GB4706.21
 - 有关性能(能耗)标准
 - IEC60705 IEC59H/69/CD QB1198
- 在能耗方面及涉及指标的表达
 - 微波炉效率： η
 - 微波炉输出功率/微波炉输入的电能值

微波炉能耗

Energy Efficiency of Microwave Oven

- Relevant standards
 - Safety standard
 - IEC335-2-25 GB4706.21
 - performance (energy efficiency) standards
 - IEC60705 IEC59H/69/CD QB1198
- The measurement of energy efficiency and involved index
 - The unit of microwave oven Efficiency : η
 - Output power/Energy value of microwave oven

微波炉能耗（续）

- 微薄炉加热均匀性
- 微波炉目前能耗水平
 - 额定输出功率 P ；微波炉效率 η

700W	57.6	900W	58.3
750W	61	950W以上	57.8
800W	59.2		
850W	60.9		

微波炉能耗(续)

Energy Efficiency of Microwave Oven (continues)

- Heating homogeneity of the microwave oven:
- Energy efficiency level of current microwave oven
 - Rated power output P ; microwave oven efficiency η

700W	57.6	900W	58.3
750W	61	above 950W	57.8
800W	59.2		
850W	60.9		

贮水式热水器能耗

- 涉及的有关标准
 - 有关安全标准
 - IEC335-2-21 35 GB4706.12
 - 有关性能(能耗)标准
 - IEC60379
- 在能耗方面及涉及指标的表达式
 - 每10L容积水的24小时固有损耗值: λ

贮水式热水器能耗

Energy efficiency of Storage Water Heater

- Relevant standards
 - Safety standard
 - IEC335-2-21 35 GB4706.12
 - performance (energy efficiency) standards
 - IEC60379
- The measurement of energy efficiency and involved index
 - Immanent Power consumption within 24 hours for every 10L water: λ

贮水式热水器能耗测试 (续)

- 贮水式热水器能耗
 - 使用量越来越大
 - 大容量的贮水式热水器节能前景好
 - 热泵热水器的发展迅速

贮水式热水器能耗测试 (续)

Energy efficiency of Storage Water Heater (continues)

- Energy efficiency of Storage Water Heater
 - Increasing application amount
 - Huge cubage storage water heater has a promising future on Energy saving
 - Quick development on heat pump water heaters

电冰箱和空调的能效分级指标

Categorical criterion of air conditioners and refrigerators

能效指数 energy efficiency index		能效等级 energy efficiency grades				
$\eta \leq 55\%$		1				
$55\% < \eta \leq 65\%$		2				
$65\% < \eta \leq 80\%$		3				
$80\% < \eta \leq 90\%$		4				
$90\% < \eta \leq 100\%$		5				
类型 types	额定制冷量(CC)/W Rated cooling capacity	能效等级 energy efficiency grades				
		5	4	3	2	1
整体式 window		2.30	2.50	2.70	2.90	3.10
分体式 split	CC≤4500	2.60	2.80	3.00	3.20	3.40
	4500<CC≤7100	2.50	2.70	2.90	3.10	3.30
	7100<CC≤14000	2.40	2.60	2.80	3.00	3.20

电冰箱和空调的能效分级原则

Categorical criterion of E-E

1级，表示国际领先水平，大约占市场份额的5~10%

2级，寿命成本最低点，大约20%市场份额，符合节能评价标准

3级，平均水平

4级 平均水平以下

5，待淘汰的低能效产品，一般市场份额为10%。

1 grade , international level, the top 5~10% of market share in term of energy efficiency

2 grade , the lowest LCC, the top 20% of market share, meets the evaluating value of energy conservation

3级 , average level

4级 below average level

5 , to be removed in 2~4 years. The lowest 10% of products

能效标准在实施中的几点情况

- 结果的准确性取决于对产品使用性能标准检测方法的执行结果
- 试验条件的设定对结果有一定的影响
- 在标准允许的误差范围内出现的不同测量结果，当结果在极限值或等级之间时，在判断产品的能效测量结果时须使用测量理论的不确定度进行结果分析。
- 不同的试验室应进行比对试验

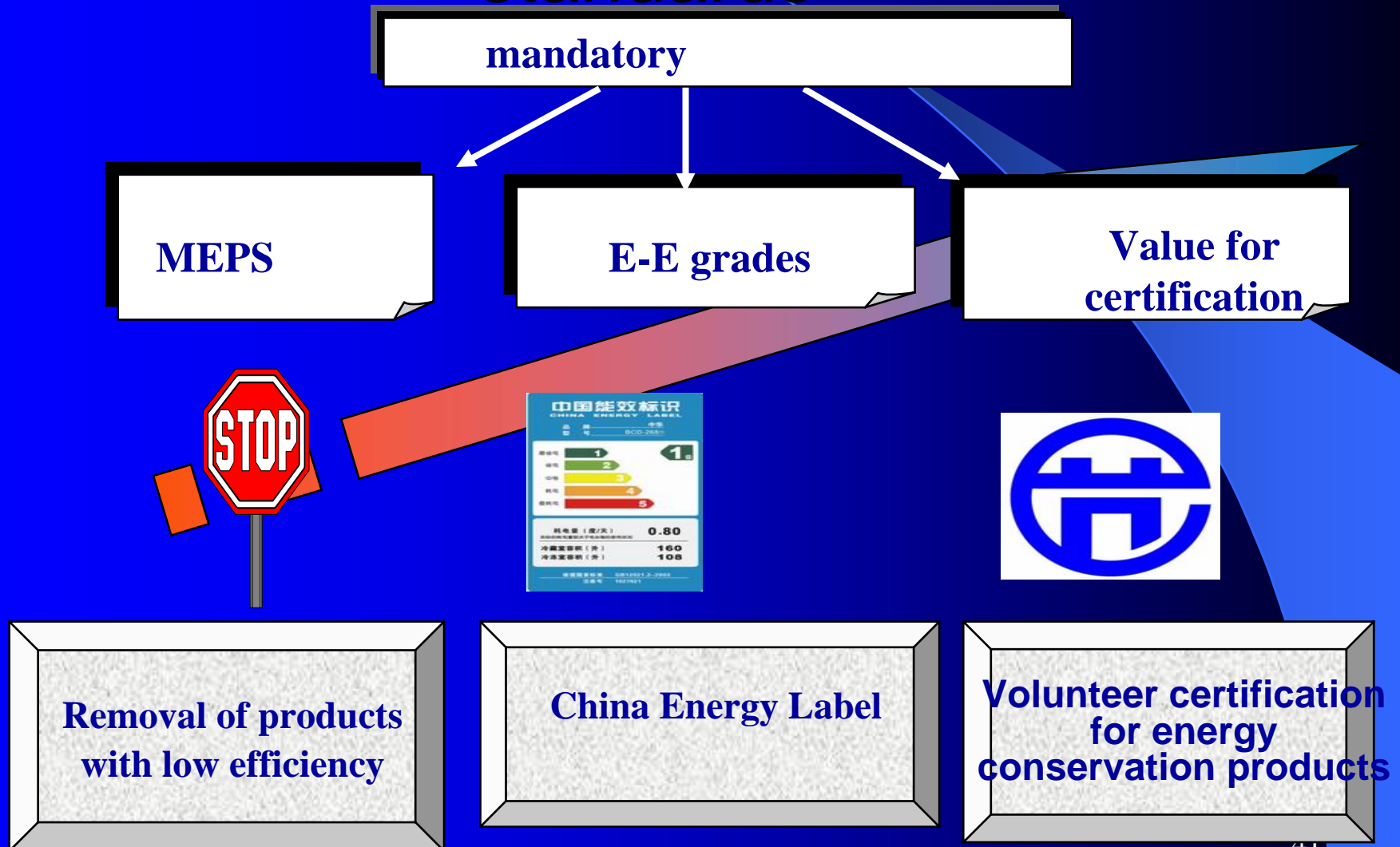
能效标准在实施中的几点情况

A few points on implementation of energy efficiency standards

- The accuracy of the testing output lies on the implementation result of product performance standards testing method
- The setting of testing conditions has certain impact on the testing result
- Provided that different testing output occurred within the standard tolerance, if the result flows between the limit value or grading, the determining of the energy consumption testing result should be done by the result analysis according to uncertainty in measurement theory.
- Comparison test between different laboratories is required

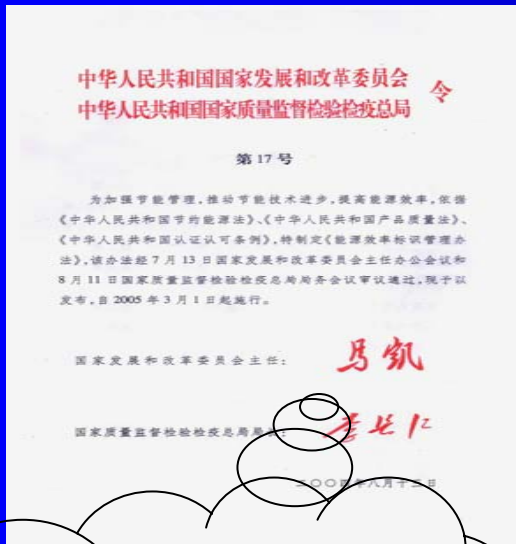
能效标准的实施框架

Implementation system for E-E standards



中国能效标识制度

Regulations on China energy label



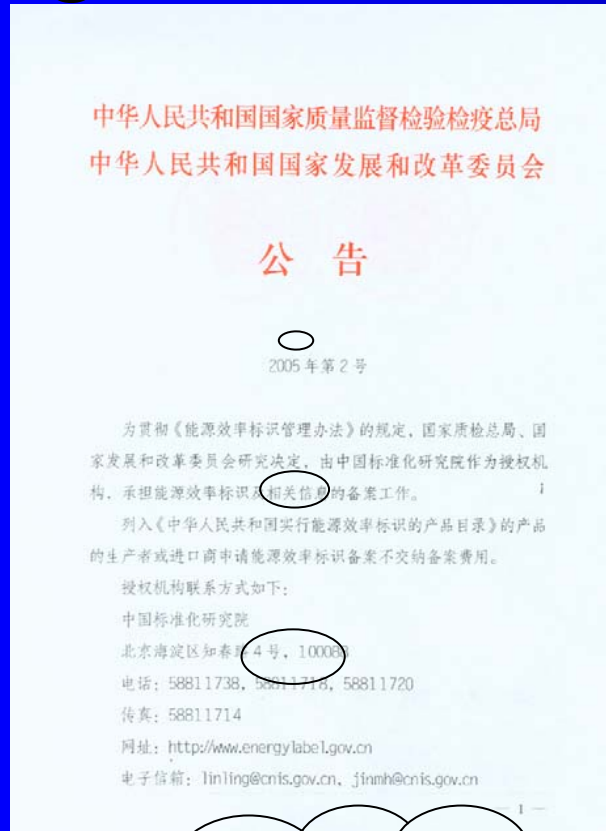
2004, August 3, " administrative regulation on energy efficiency label " was issued by NDRC, and AQSIQ.



2004, Nov. the first product list for the label, the pattern of the label, the implementation specifications for refrigerator and air conditioner were issued by NDRC, AQSIQ and CNCA

中国能效标识制度(续)

Regulations on China energy label



**2005, Jan. , NDRC and AQSIQ
authorized CNIS to take charge
of registering, checking and
bulleting of the label**

[WWW.energylabel .gov.cn](http://WWW.energylabel.gov.cn)

**明确了标识授权机构
(2005年1月7日发布公
告)**

强制性能效标识制度

China energy label enforced

- ❑ 列入目录的产品，应在产品或产品最小包装的明显部位标注能效标识，在产品说明书上说明产品能源效率等级
- ❑ 2005.3.1日，电冰箱和空调开始强制实施能效标识制度
- ❑ 洗衣机、中央空调等产品可能在2006年强制实施能效标识制度
- ❑ The label is mandatory for products listed. Products listed shall present the unified label on conspicuous part of the product body and the relevant explanation shall be given in the product's instruction book.
- ❑ Refrigerators and room air conditions was enforced to implement the label system from 1st March 2005.
- ❑ Maybe, washers, central air conditioners will enter the list in a year.

能效标识的基本样式

Basic Pattern of China

mode

High efficiency

Low efficiency

Code of
Energy efficiency
standard

中国能效标识
CHINA ENERGY LABEL

生产者名称 _____ X X
规格型号 _____ X X X X

耗能低 1 2 3 4 5
中 等
耗能高

注1 能源消耗量指标
注2 与节能有关的其它主要性能指标

依据国家标准: GB XXXXX-XXXX

manufactures

Energy efficiency
grade

some parameters

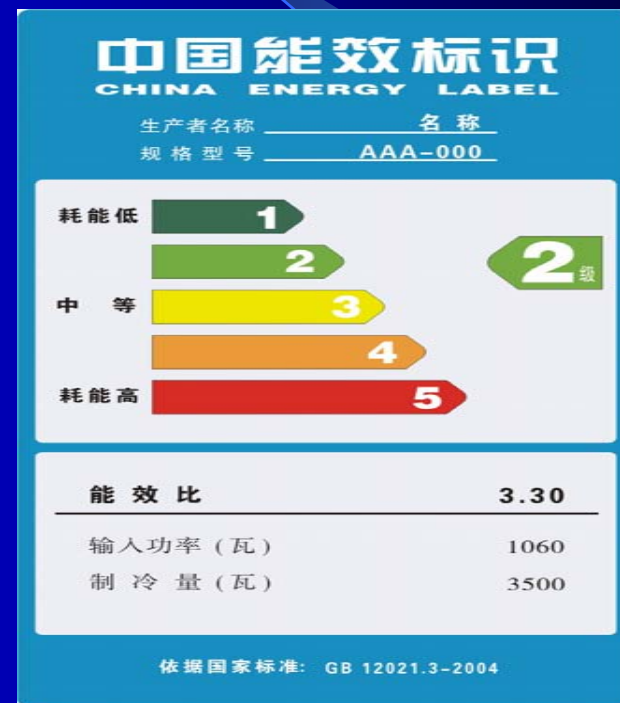
注1: 指能源效率的关键指标, 不同产品标注的指标不同。
注2: 不同产品标注的指标不同。

中国能效标识样式

Pattern of China energy label



家用电冰箱 refrigerators



房间空气调节器 room air conditioners

备案要求

Requirements of Energy efficiency's register.

生产者或进口商应当自使用能源效率标识之日起30日内，向授权机构备案，备案材料：

- (一)身份证明；
- (二)产品能源效率检测报告；
- (三)能源效率标识样本；
- (四)初始使用日期等其他有关材料；

(五)由代理人提交备案材料时，应有生产者或进口商的委托代理文件等。

外文材料应当附有中文译本，并以中文文本为准。

the products shall be registered within 30 days after it has been labeled. The following documents shall be provided :

1. Copy of the business license or the testimonial of their registration for manufacturers; copy of the relevant contract with the producers overseas for importers;
2. Test report of the product energy efficiency;
3. Sample of the label;
4. Other relevant information, such as the initial date to apply the label;
5. In the case that an agent submits, on behalf of the manufacturer or the importer, documents for the registration, a proxy document of the client shall be presented.

A Chinese version shall be submitted along with the documents originally written in foreign language, and the former is given preference.

标识的公告



Products attached the label



Thank you
very much!